

## Procurement of electric buses and charging system

Miejski Zakład Komunikacji S.A., Ostrów Wielkopolski (Poland)

### Background

The city of [Ostrów Wielkopolski](#) has 72,000 inhabitants, and is located in central Poland. In order to address problems such as congestion and urban air pollution, the city has been implementing sustainable urban mobility measures since 2014, including improving the sustainable transport network, introducing electronic ticketing and timetabling, and implementing traffic management measures.

In addition, the Municipal Transportation Company ([Miejski Zakład Komunikacji S.A.](#) - MZK) has been upgrading its old bus stock with more sustainable alternatives. In 2017, MZK procured its first three Euro 6 buses and first four electric buses. One year later in 2018, three further Euro 6 vehicles were purchased, and most recently in June 2019, it procured six more zero emission electric buses.



The upgrading of the bus stock is part of a project called *Modernisation of urban transport in Ostrów Wielkopolski*, co-financed by the European Union from the European Regional Development Fund (ERDF) under the Wielkopolska Regional Operational Programme for 2014-2020. The aim of the project is to reduce emissions of harmful substances to the atmosphere by increasing the use of public transport in the area.

### Procurement objectives

As part of the urban transport project, MZK published its most recent call for tenders in June 2019 for 6 electric low-floor city buses with a dedicated traction battery charging system for the city.

The procuring authority chose an open procedure to make sure that all interested suppliers could deliver bids. Funding from the EU programme made the procurement of high technology buses possible.

The contract was concluded in August 2019, and the new buses will be in operation from August 2020.

### Criteria used

#### Subject matter of the contract:

Supply of six new electric low-floor city buses with a dedicated traction battery charging system.

#### Technical specifications:

The offered buses should be manufactured using the latest technology and knowledge to ensure trouble-free operation with minimum maintenance effort. An annual average mileage of 70,000 km should be guaranteed.

The electric motor(s) should have a capacity of at least 160 kW, powered by an electric energy storage facility of 200 kWh.

The buses have to be equipped with five field-mounted pantographs on the roof to allow the traction batteries to be charged with at least 200 kW of charging power without reducing the service life of batteries, accumulators, supercondensators or others.

The charging system for the buses' electricity storage shall meet the requirements and specification in the standard [EN 61851](#): electric vehicle conductive charging systems or equivalent.

Minimum warranty and service conditions were set for several parts of the buses, e.g.:

- body and chassis frame - minimum 10 years
- sheathing and roof - minimum 10 years
- window tightness - minimum 10 years
- paint coatings - minimum 5 years
- whole bus - minimum 36 months
- batteries or supercapacitors or other equipment, in which electric energy for electric traction is stored - minimum 8 years

The supplier must guarantee that buses will run for at least 130 km on a full battery. Offered buses must be designed in a way that ensures failure-free long-term operation under all weather conditions from -25°C to +45°C. The electrical energy storage facility should be rechargeable while the bus is running, by electricity generated during braking (energy recuperation).

Award criteria:

The contract award was based on the most economically advantageous offer. Assessment was based on technical and operational parameters (40%) and on price (60%).

For the technical and operational performance parameters, points were awarded for technical and operational parameters, including electricity consumption, verified by the SORT 2 test<sup>1</sup>. Points were awarded according to the following scale:

- Lowest electricity consumption kWh/100 km - 7 points
- Electricity consumption up to and including 5% higher than the lowest consumption offered - 5.5 points
- Electricity consumption over 5% and up to 10% higher than the lowest consumption offered - 4 points
- Electricity consumption over 10% and up to 15% higher than the lowest consumption offered - 2 points
- Electricity consumption over 15% and up to 18% higher than the lowest consumption offered - 1 point
- Electricity consumption more than 18% higher than the lowest consumption offered - 0 points

"The purchase of electric buses is estimated to reduce the average CO<sub>2</sub> emissions by 76.6 tonnes CO<sub>2</sub> /per year for each bus replaced. This means that the city of Ostrów Wielkopolski will save about 460 tonnes of CO<sub>2</sub> every year when the buses are in operation."

<sup>1</sup> Standardised On-Road Test ([SORT](#)) developed by UITP (Union Internationale des Transports Publics), in this case the SORT-2 test - Easy Urban Cycle - reflecting the operating conditions of a typical urban route.

## Results

MZK awarded the contract in autumn 2019. Only one supplier submitted a bid, but it was able to meet all the requirements of the tender and the terms and conditions of the contract.

The value of the contract was approximately 3.5 million euros, for the delivery of the six Urbino 12 electric buses within 365 days after the signing of the contract (by the end of August 2020). The three door buses are 12 metres long and about 14 tonnes. Each of the buses holds a total of 28 seats and room for 49 passengers standing. They will have air conditioning system regulating the temperature of the whole vehicle, passenger information system and USB charger ports for the passengers. In addition, defibrillators will be placed on board of the vehicles, increasing the public access to medical equipment.

The service life of electric buses is estimated to be 12-15 years, depending on their use, the ambient conditions and their charge rate. The upfront investment costs of electric buses are higher than diesel buses, but in terms of life cycle costs, studies have shown ([source](#)) that they can be more affordable in long-run, as calculated according to forecast changes in fuel and electricity prices and decreases in battery prices, and also accounting for the maintenance costs of electric buses.

## Environmental impacts

The new electric buses contribute to the replacement of old diesel buses and, thus, improvement of the local air quality and reduced noise, in addition to reducing the greenhouse gas-emissions from public transport. This will have a positive effect on the city's public health and make public transport more attractive. Electric buses have zero emissions of NOx and particulate matter, which have negative health impacts on the respiratory system and heart.

The buses will be powered by electricity, making Ostrow's solution the first of its kind in the country.

The purchase of electric buses is estimated to reduce the average CO<sub>2</sub> emissions by 76.6 tonnes CO<sub>2</sub> /per year for each bus replaced. This means that the city of Ostrów Wielkopolski will save about 460 tonnes of CO<sub>2</sub> every year when the buses are in operation.

## Lessons learned

Electric buses require a high upfront investment, meaning ERDF co-financing was an important mechanism for allowing this upgrade to the city's bus stock. However, calculations done on the future operating cost of the electric buses indicate that in the medium to long term, the electric bus fleet will be more cost effective than diesel buses. As such, MZK is committed to further investment in electric buses.

MZA is so far satisfied with the tender and will use this experience for planning the next procurement of electric buses. The main aspects for the subject of the contract would be specified in a similar way as in the previous tender.

In the case of preparing tenders with the participation of EU subsidies, particular attention should be paid to the compliance of the procedure of the EU Directives on Public Procurement and the Regulations specified by the donor.

### Contact person:

Karolina Pająk, Wydział Kultury i Promocji Miasta, [kpajak@umostrow.pl](mailto:kpajak@umostrow.pl)

Link to [tender documents](#).

For related information, please see European GPP criteria for the [purchase of bus services](#) and the [Technical Background Report](#).